BUT two articles of the October *Monist* are technically scientific in character. The first is by Professor A. S. Packard, of Brown University, and gives for the first time, in actual translations, a complete statement of Lamarck's views on the origin and evolution of man, and of his thoughts on morals, and on the relation between science and religion. Professor Packard believes that Lamarck's attempt at explaining the probable origin of man from some arboreal creature allied to the apes is more detailed and comprehensive than that offered by Darwin in his 'Descent of Man,' which was virtually anticipated by Lamarck. The second article, by Professor Arnold Emch, of the University of Colorado, treats of the 'Mathematical Principles of Esthetic Forms.' Starting from the physiological conditions for the perception of esthetic forms, the author proceeds to investigate the abstract law of symmetry as embodied in the principle of the group, projective and perspective transformation, inversion, etc., showing, for example, that the principle of repetition finds its mathematical expression in the geometry of the group, and explaining also why the various species of geometrical transformation do not destroy the impressions of axial and central symmetry. The remaining articles are: (1) an essay on modern Biblical criticism, by Professor Paul Schwartzkopff, entitled 'The Belief in the Resurrection of Jesus and its Permanent Significance'; (2) an illustrated paper on the 'Greek Mysteries as a Preparation for Christianity,' by Dr. Paul Carus; (3) 'The Ethics of Child-Study,' by Dr. Maximilian P. E. Groszmann; and (4) a report on the recent Psychological Congress at Paris. (Chicago: The Open Court Publishing Co.)

The Journal of Physical Chemistry, October. 'Toxic Action of Acid Sodium Salts on *Lupinus albus*,' by Louis Kahlenberg and Rollan M. Austin. Acid salts are found to be much more poisonous than they ought to be, assuming their toxicity to be due to the hydrogen ions only. 'Relationships between Thermodynamic Fundamental Functions,' by J. E. Trevor. 'The Boiling-points of Mixtures of Chloral and Water,' by Joseph C. Christensen. 'On the Emission and Absorption of Water Vapor by Colloidal Matter': correction, by P. Duhem. 'Quantitative Lecture Experiments on Electro-Chemistry,' by W. Lash Miller and Frank B. Kenrick. Description of an ingenious measuring instrument for rendering the results of experiments visible to a large audience, and a number of selected experiments.

SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES.

SECTION OF ASTRONOMY, PHYSICS AND CHEMISTRY.

A MEETING of the Section was held on Monday, October 1st, at 12 West 31st Street.

Professor E. R. Von Nardroff presented a paper 'On the Application of Fizeau's Method to the Determination of the Velocity of Sound,' with an experimental illustration. He used sound of very short wave length, beyond the limits of hearing. The sound was detected by means of a sensitive flame. He overcame the effect of irregular disturbing reflected and diffracted waves by using sound of considerable intensity and a flame only slightly sensitive. The sound after passing between the teeth of a rapidly revolving wheel, fell on a concave spherical mirror made of wood, some distance away, and was reflected back through the teeth at the opposite end of a diameter of the wheel, and came to a focus on a sensitive flame just behind the wheel. The author gave a neat demonstration of the working of the apparatus, and showed with great ease how with increasing speed of the revolving wheel the flame was alternately shielded from and exposed to the sound. The slightest disturbance of the adjustment of the mirror threw the focus away from the flame in a marked manner. He stated that the method could probably not be used to compete with other accurate methods heretofore used, but it supplied a beautiful illustration of Fizeau's method of measuring the velocity of light.

Professor J. K. Rees gave an interesting account of some of the scientific instruments at the Paris Exhibition. The great telescope was not yet finished, although this fact was not yet generally known, and it was impossible to tell yet whether it was to be a success. The German exhibit was superb. The Germans had a

method which ought to have been generally adopted, of arranging the instruments with each kind by the different makers in one case, instead of a complete line by each maker in a case by itself. An ingenious modification of Foucault's pendulum was seen at the Paris Observatory. It was only one meter long, but it showed the fact of the rotation of the earth after the lapse of fifteen seconds.

Professor Hallock described a peculiar lightning discharge he had observed at Lake Champlain. The flash came unexpectedly from a cloud about two miles from where the main shower was falling. It struck on a mass of rock, and on examining this it was found that instead of there being one or a few places where the lightning had struck, it was covered with innumerable little spots, each one indicating where a part of the flash had struck.

WILLIAM S. DAY,
Secretary.

NOTES ON PHYSICS.

THE GALTON WHISTLE.

IN the *Annalen der Physik* for July, 1900, Edelmann describes an improved form of the Galton whistle for use in studying the limits of audibility of high pitch sounds. This improved form of whistle is similar to the locomotive whistle in design, the vibrating air column being from 2 to 4 millimeters in diameter and from 0.7 to 5 or more millimeters in length. With a whistle 2 mm. in diameter Edelmann has produced sound waves, using the word sound in its physical sense, of 2 mm. wave-length, corresponding to a vibration frequency of 170,000 double vibrations per second. This is nearly an octave higher than the highest pitch obtained by König in 1899.

Edelmann determined the pitch by measuring the wave-length of the sound as indicated by Kundt's dust figures, in an elongated glass tube resonator. This resonator for the very high pitch waves was less than a millimeter in diameter of bore and about ten millimeters in length.

The present writer remembers well a very striking lecture experiment by Professor Kundt in 1890, in which the pitch limit of audibility was demonstrated by a Galton whistle, the actual existence of the physical sound, when the whistle was adjusted to give more than about 40,000 vibrations per second, was beautifully shown to a large audience by the effect of the whistle upon a sensitive gas flame.

THE GENESIS OF THE IONS IN THE DISCHARGE OF ELECTRICITY THROUGH GASES.

THE phenomena of the electric discharge through gases seemed only a few years ago to be so complicated that physicists almost despaired of finding an hypothesis which might bring order out of the mass of experimental results which had accumulated.

The discovery of the Röntgen rays stimulated research in this field greatly, and the observation that these rays in passing through a gas cause it to become an electrical conductor soon gave fixedness to the idea that a gas conducts electricity by having its molecules broken up into positively and negatively charged parts or ions which wander about through the gas.

This ionic hypothesis has already been of great value in suggesting lines of research; and the rapidly accumulating results of these recent researches, interpreted, of course, through the ionic hypothesis itself, show, under the widest variety of conditions, a degree of consistency which is rapidly giving to the ionic hypothesis the dignity of an established theory.

Some of the most striking applications of the ionic hypothesis have been noted in SCIENCE during the past three years.

PROFESSOR J. J. THOMSON, in the *Philosophical Magazine* for September, points out in a paper entitled 'The genesis of the ions in the discharge of electricity, through gases,' why the dielectric strength of a gas is approximately proportional to the pressure of the gas; why the dielectric strength of a thin layer of gas is greater than the dielectric strength (volts per centimeter) of a thick layer of the same gas; and he explains the striations of the positive column or glow in a Geissler tube.

The reader should keep in mind that the scientific explanation of a thing is a description of the thing in the simplest possible terms. Many scientists feel an objection to the use of the word *explanation* in that its use tends to confirm a hearer in the acceptance of the figments of his